

## DOCUMENT RESUME

ED 225 505

HE 015 866

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TITLE Maryland State Board for Higher Education Operating Budget Guideline Development. A Report to the Joint Chairmen of the Senate Budget and Taxation Committee and House Appropriations Committee, 1982 Session.  
INSTITUTION Maryland State Board for Higher Education, Annapolis.  
PUB DATE 24 Nov 82  
NOTE 61p.  
AVAILABLE FROM Maryland State Board for Higher Education, 16 Francis Street, Annapolis, MD 21401.  
PUB TYPE Reports - Descriptive (141) -- Guides - Non-Classroom Use (055)  
EDRS PRICE MF01/PC03 Plus Postage.  
DESCRIPTORS \*Budgets; College Administration; College Buildings; College Instruction; College Libraries; \*Costs; Educational Facilities; Educational Finance; \*Guidelines; \*Higher Education; Program Costs; \*Resource Allocation; School Safety; \*State Standards; Student Personnel Services  
IDENTIFIERS \*Maryland

## ABSTRACT

A report to the Maryland Congress on operating budget guidelines of the Maryland State Board for Higher Education is presented. Information is presented on the development of the guidelines since their inception in 1976 and on all changes made to the original guidelines. The guidelines used each year since 1976 are listed. In the development of the guidelines, and in the on-going revision process, it was considered that the guidelines were to produce a maintenance budget for an institution. Some portion of this maintenance budget would be met by general funds with the remainder met by special and federal funds. The guidelines were developed in the context of current state funding parameters. The guideline for instruction has three components: a fixed cost, a variable cost component for instruction, and a variable cost component for departmental research. The guideline for the administration program consists of a fixed cost component, a component related to enrollment, and a component related to the number of nonguideline programs. The number of nonguideline programs represents a measure of the complexity of the school. Guidelines for the library, student services, physical plant, and public safety guidelines are also outlined. (SW)

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ED225505

MARYLAND STATE BOARD FOR HIGHER EDUCATION  
OPERATING BUDGET GUIDELINE DEVELOPMENT

A Report to the Joint Chairmen of the  
Senate Budget and Taxation Committee  
and

House Appropriations Committee

1982 Session

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Maryland State Board for Higher Education  
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November 24, 1982



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## FOREWORD

The State Board for Higher Education has prepared this report on its budget guidelines in response to the April 1982 Report of the Joint Chairmen of the Senate Budget and Taxation Committee and the House Appropriations Committee. The report provides information on the development of the guidelines since their inception in 1976 and all of the changes made to the original guidelines including the revision of the Public Safety guideline at the suggestion of the Joint Chairmen.

We are grateful for the cooperation and assistance provided by the segments of higher education in Maryland who provided comments and additions in the development of the guidelines.

Dr. Mary McKeown of the Division of Finance and Facilities had primary responsibility for this report.

Sheldon H. Knorr  
Commissioner

## EXECUTIVE SUMMARY

The Maryland State Board for Higher Education (SBHE) was directed by the April 1982 Report of the Joint Chairmen of the Senate Budget and Taxation Committee and the House Appropriations Committee to provide a report regarding the current status of the Board's funding guidelines. This report is in response to the request of the Joint Chairmen. The report provides information on the development of the guidelines since their inception in 1976 and discusses all of the changes made to the original guidelines, including the revision of the Public Safety guideline at the suggestion of the Joint Chairmen. In addition the method for annually revising the guidelines to reflect the impact of inflation is discussed. Listed are the guidelines used each year since the original development of the guidelines in 1976.

In the development of the guidelines, and in the on-going revision process, the State Board for Higher Education has considered that the guidelines were to produce a maintenance budget for an institution. Some portion of this "maintenance budget" will be met by General Funds with the remainder being met by Special and Federal Funds. The Statewide Plan indicates that the expenditures at the institutions should be at 100 percent of the Guidelines and that State General Funds should provide 70 percent of the funds needed for the guideline programs. The guidelines do not account for an institution's special needs when initiating a program or when catching up in an area. As the guidelines were developed, no attempt was made to determine the adequacy of total funding relative to peer institutions or to where higher education "should" be funded; rather, the guidelines were developed in the context of current State funding parameters.

The guideline for Instruction has three components: a fixed cost, a variable cost component for instruction, and a variable cost component for departmental research. The research component was not explicitly included in the original guidelines; it has been included in the revised guidelines to delineate



more clearly institutional roles and missions. The variable cost component for instruction is a 4 x 4 matrix of costs per credit hour delineated by course level and program cost. In consideration of an environment in which some colleges and universities are facing declining enrollments, some are expanding enrollment and services to students, and some are experiencing shifts in levels of enrollment and academic fields, the Instruction guideline provides two computational options for a school. Alternative A allows an institution to use only its projected credit hours in the matrix, while Alternative B allows an institution to use the average of its actual and projected credit hours.

The guideline for the Administration program consists of three parts: a fixed cost component, a component related to enrollment, and a component related to the number of non-guideline programs. The number of non-guideline programs represents a measure of the complexity of the school. The revised Library guideline is composed of five parts: a fixed cost component; a component for normal, on-going book purchases; a component to reflect faculty needs; a component for enrollment needs; and a component to reflect research needs. The revised Student Services guideline recognizes that there is a fixed cost component associated with non-academic services for students and that the variable costs of this program are related to the number of admission applications and FTES. The Public Safety guideline was revised to reflect changes in services and has four components: a fixed cost; a component related to students; a measure related to size and complexity of the institution (GSF); and a measure to reflect geographic location (UR). Four guideline institutions are considered to be "urban" campuses: Coppin, Morgan, University of Baltimore, and University of Maryland - College Park. The Physical Plant guideline has four components: a fixed cost; a measure of the building space maintained; a component related to student use; and fuel and utilities.

## Introduction

The April, 1982 Report of the Joint Chairmen of the Senate Budget and Taxation Committee and the House Appropriations Committee required the State Board for Higher Education to present a report regarding the current status of the Board's funding guidelines:

Funding Guidelines: The Committees have noted the existence of funding guidelines for public four-year institutions promulgated by the State Board for Higher Education. The Committees wish to note that these guidelines were used extensively during the review of the Fiscal Year 1983 operating budget. Reductions were kept to a minimum to provide the institutions the opportunity to address shortages noted in other programs through the internal reapportionment of staff and funds. The Committees request that a report regarding the current status of and any changes to the guidelines be presented to them no later than October 30, 1982. It is further recognized that the establishment of viable funding and staffing standards will promote efforts toward greater budget flexibility while providing a comparative funding base for Executive and Legislative review.

Explanation: The Committees wish to support the concept of funding and staffing standards within Higher Education. While these standards address many of the basic funding needs, the Committees realize that special needs must be separately reviewed. The State Board should investigate the needs for any revision to the guidelines, especially the Public Safety Program. The guideline for this program did not appear to identify properly the basic needs of the institutions. In addition, the Committees noted certain inconsistencies and questions regarding the level of public safety required, the method of administration of this program, and the request for comparability with other public safety programs, such as State Police and correctional systems.

This report discusses the development of the guidelines, revision of the Public Safety guideline and the method for annually revising the guidelines for inflation.



### Rationale for Guideline Development

Operating Budget guidelines, for Instruction, Administration, Library, Student Services, Physical Plant, and Public Safety programs at the public four-year colleges and universities of Maryland were developed originally by a committee of the State Board for Higher Education in 1976. This committee was advised by representatives from all the segments of higher education in Maryland as well as some SBHE Board members. There were several considerations which guided the development of the guidelines, and which continue to guide the SBHE when revising the guidelines.

1. The guidelines were to be zero-based and to focus on productivity by estimating expenditures on the basis of the number of students expected to be served in a given year and the nature of the services to be provided students. The guidelines were not to be used as an incremental approach in which expenditures in any year were dependent mainly on expenditures in the previous year, regardless of institutional productivity.

2. The guidelines were to focus on total program expenditures (i.e., instruction, student services) rather than on expenditures by objects within program (i.e., salaries, travel).

3. The guidelines were to enable comparisons to be made among similar programs at different institutions in order to provide for equitable treatment of all schools.

4. The guidelines were to take into account differences in the types and levels of instructional programs offered by different institutions and differences in the missions of the institutions.

5. The guidelines were to take institutional size into account in order to recognize the differences in economies of scale which are possible for institutions of different sizes.

6. The guidelines were to approximate the expenditure norms for all institutions of a given size for similar activities.

7. As much as possible, the guidelines were to utilize the budget submitted by institutions to the Department of Budget and Fiscal Planning as the source of data, in order not to impose additional requirements for data on institutions.

The application of the guidelines produces a maintenance budget for the educational program at an institution. The guidelines do not account for an institution's special needs when it is initiating a new program, nor do they account for an institution's need to catch up in an area. For example, if an institution needs to purchase a substantial number of new books to service adequately its Instruction program, the guideline for the Library would not reflect this need for a catch-up purchase. The Library guideline will only reflect the normal operating and book replacement costs at an institution. In addition, the guidelines were derived to represent the average level of expenditures in a program for all institutions of a given size; the guidelines represent a set of norms for institutional expenditures by program.

The guidelines are used to calculate the total requirement for the educational program at each institution. Some portion of this requirement is met by General Funds with the remainder being met by Special and Federal Funds. Underlying the guidelines is the philosophy that the total funding amount is the important indicator of an institution's position relative to other guideline institutions. An institution may exceed the guideline level of expenditure in one program and be under guideline in another program, while still not exceeding 100 percent of the total guideline level. These differences among programs may reflect differing institutional priorities and objectives rather than "mis-allocation" of funds.

The guidelines were developed and are adjusted annually based on actual costs at Maryland institutions. Other approaches, including comparisons to peer institutions, could have been employed in the guideline development process.



The guidelines are used by the SBHE in its budget analyses for the Consolidated Capital and Operating Budget Recommendations to the Governor and the General Assembly. The SBHE budget analysis focuses on deviations from the guidelines and on explanations of the reasons, if any, for budget requests in given programs that are significantly above or below the guideline level. Additionally, the guidelines are used by the SBHE in the program approval process to determine the fiscal impact of adding to or deleting a program from an institution's offerings. The guideline amount determined by multiplying the credit hours generated by the costs associated with those hours in the instruction guideline matrix of costs is compared to the projected program costs in the program evaluation process. An assessment is made based on the comparisons between these costs.

### 1976 Guidelines

The guidelines developed in 1976 include six separate guidelines. Each of the guidelines relates to a budget program.

The guideline for the Instruction program accounts for more than 50 percent of the total guideline expenditures at most institutions. This guideline is dependent on the instruction method typically used to teach courses in various subject areas as well as the level of the course.

The original guideline recognized three instructional methods: laboratory intensive, mixed laboratory-lecture, and lecture intensive. Four course levels were recognized; lower division undergraduate, upper division undergraduate, and graduate research. Each institution received the same dollar value for each credit hour produced at the same level with the same instructional method. Among the instructional methodologies and levels of instruction, costs were related under a cost matrix, which is shown as Table 1.

TABLE 1.

#### Relative Costs Per Credit Hour For Instruction

| <u>Instructional<br/>Methodology</u> | <u>Lower<br/>Division</u> | <u>Upper<br/>Division</u> | <u>Graduate</u> | <u>Graduate<br/>Research</u> |
|--------------------------------------|---------------------------|---------------------------|-----------------|------------------------------|
| High Lab                             | 2.5                       | 3.2                       | 6.0             | 20.0                         |
| Mixed Lab-Lecture                    | 1.5                       | 1.9                       | 3.6             | 12.0                         |
| High Lecture                         | 1.0                       | 1.2                       | 2.4             | 8.0                          |



The guideline for the Administration program was based on the instruction budget and the number of FTEs. This formula considered economies of scale by providing a cost per student for Administration that decreased as the size of the school increased.

The guideline for the Library program was dependent both on the number of credit hours produced at an institution and on the level of the credit hours. The library usage and book requirements of a graduate student were recognized to be greater than those of an undergraduate student; thus, the credit hours were weighted by level. This formula also recognized that there were economies of scale in the library program. The size of the library budget increased at a somewhat slower rate than the rate of growth of credit hours produced.

The guidelines for Student Services and Public Safety were based on the number of FTEs. Both of these formulas recognized the existence of economies of scale. The guideline used for calculating the Plant Operation and Maintenance budget was directly related to the number of square feet in academic and academic-related buildings.

The rationale for the guidelines as presented in 1977 is reproduced as Appendix A.

## Update of the Guidelines through FY 1981

The SBHE guidelines were first applied in the review of the FY 1979 request budget. Between FY 1979 and FY 1981, the guidelines developed in 1976 were updated each year to reflect inflation. Inflation rates used each year are shown in Table 2. Guidelines for each year are contained in Appendix B. Guidelines shown in Appendix B may reflect two adjustments in any one year: 1) an inflation adjustment and 2) a salary increase adjustment, when a cost-of-living increase was provided by the State. In its review of operating budget requests, the State Board for Higher Education used guidelines adjusted by the inflation factor only. In the evaluation of the appropriation, the SBHE guidelines were revised by the actual salary adjustment made by the State for the cost-of-living increase. For example, in the evaluation of FY 1980 budget requests, the Board used FY 1980 guidelines adjusted only for inflation. For the evaluation of the FY 1980 appropriation, as a part of the review of the FY 1981 budget request, the FY 1980 guidelines were further adjusted for the state-wide salary increases.

Table 2.  
Inflation Rates For Guideline Adjustment

| <u>Guideline</u>         | <u>1980</u> | <u>1981</u> |
|--------------------------|-------------|-------------|
| Instruction              | 6.5%        | 5.6%        |
| Administration           | 6.5         | 5.6         |
| Library                  | 6.5         | 4.0         |
| Student Services         | 6.5         | 3.7         |
| Public Safety            | 6.5         | 3.7         |
| Physical Plant Operation | 6.5         | 15.5        |

In addition to inflationary adjustments, the guidelines were reviewed each year to ascertain if other refinements were necessary. When necessary, the guidelines were altered to better reflect changes in actual conditions.



For the FY 1980 guideline review, changes were made in the matrix of weighting factors in the Instruction guideline to reflect more accurately costs of graduate research. The matrix originally had weights ranging from one to twenty. This revision increased the high lab-graduate research weight to 25. Weighting factors in the matrix for FY 1980 and FY 1981 are listed in Table 3. Further refinements were made in the classification of academic programs by category for the FY 1981 guidelines.

TABLE 3

Relative Costs Per Credit Hour for Instruction

| <u>Instructional Methodology</u>           | <u>Lower Division</u> | <u>Upper Division</u> | <u>Graduate</u> | <u>Research</u> |
|--------------------------------------------|-----------------------|-----------------------|-----------------|-----------------|
| <u>FY 1980:</u>                            |                       |                       |                 |                 |
| High Lab                                   | 2.5                   | 3.2                   | 6.0             | 25.0            |
| Mixed Lab-Lecture                          | 1.5                   | 1.9                   | 3.0             | 15.0            |
| High Lecture                               | 1.0                   | 1.2                   | 2.4             | 10.0            |
| <u>FY 1981 (before salary adjustment):</u> |                       |                       |                 |                 |
| High Lab                                   | 2.5                   | 3.2                   | 6.0             | 25.0            |
| Mixed Lab-Lecture                          | 1.5                   | 1.9                   | 3.0             | 15.0            |
| High Lecture                               | 1.0                   | 1.2                   | 2.4             | 10.0            |
| <u>FY 1981 (after salary adjustment):</u>  |                       |                       |                 |                 |
| High Lab                                   | 2.4                   | 3.1                   | 5.7             | 23.8            |
| Mixed Lab-Lecture                          | 1.4                   | 1.8                   | 3.4             | 14.3            |
| High Lecture                               | 1.0                   | 1.2                   | 2.4             | 10.0            |

### FY 1982 Guideline Revision

After four years of experience with the guidelines, the State Board for Higher Education, with the assistance of the Finance Advisory Committee enhanced by additional segment representatives, undertook a comprehensive review of the operating budget guidelines. (The report of the Task Force appears as Appendix C.)

The review resulted in changes to all of the guidelines. The revised guidelines were based on the same seven considerations that guided the development of the original guidelines in 1976. Because several Maryland schools were experiencing declining enrollments while others were expanding services to students, the revised guidelines provide for an averaging of enrollments over two years. This "averaging" permits an institution to plan for changes in funding and avoids precipitous decreases in revenues. The revised guidelines additionally provided explicitly for the large costs of research for those schools with a research mission.

Within the Instruction Program, the revised guidelines were based on a new cost matrix, shown in Table 4.

TABLE 4.  
Relative Costs Per Credit Hour For Instruction

| <u>Cost of Program</u> | <u>Lower Division</u> | <u>Upper Division</u> | <u>Graduate</u> | <u>Graduate Research</u> |
|------------------------|-----------------------|-----------------------|-----------------|--------------------------|
| High                   | 2.5                   | 7.5                   | 15.0            | 20.0                     |
| Medium-High            | 2.0                   | 6.0                   | 12.0            | 16.0                     |
| Medium-Low             | 1.5                   | 4.5                   | 9.0             | 12.0                     |
| Low                    | 1.0                   | 3.0                   | 6.0             | 8.0                      |

The revised guidelines for FY 1982 are shown in Appendix B as Table B-8.



### Process for Updating the 1982 Guidelines

Guidelines developed in 1981 are updated annually through the process delineated below to reflect adequately the impact of inflation on the guideline institutions. Chase's inflation rates by object of expenditure used in the updating process are in fact in Table 5.

1. The July Chase Econometrics projections are used to calculate inflation adjustments. Chase's projections for changes in per capita income are used to calculate "inflation" for Salaries and wages. Fuel and utilities increases are based on increases in the cost of fuel oil and gas. "Total durable goods" price changes are used to calculate changes in the costs of equipment while projected differences in the Consumers Price Index are used to calculate changes in the costs of all other items.

As is mentioned above, updating the guidelines for "salary increases" is done by use of the Chase Econometrics projection for changes in per capita income. As a result of this methodology, in years where the statewide salary increase is greater than the increase projected for per capita income, the guidelines will be adjusted at a lower rate of increase than that of salaries. Guidelines for a year in which this occurs will show progression toward the goal of 70 percent support of State General Funds in the guideline programs. In years when the increase in per capita income projected by Chase Econometrics is greater than the statewide salary increase, there will be an apparent regression from the goal of 70 percent State General Fund support in the Guideline programs.

2. After inflation adjustments are calculated for the guidelines, the Finance Advisory Committee will meet to review changes in the guidelines due to inflation, and to make any recommendations for structural revisions to the guidelines.

TABLE 5  
Inflation Rates

| <u>Object</u> | <u>1982 to 1983<br/>Inflation Rate</u> | <u>1983 to 1984<br/>Inflation Rate</u> |
|---------------|----------------------------------------|----------------------------------------|
| 01            | 7.0%                                   | 4.75%                                  |
| 02            | 8.0                                    | 6.7                                    |
| 03            | 9.0                                    | 10.0                                   |
| 04            | 9.0                                    | 6.7                                    |
| 05            | 9.0                                    | 6.7                                    |
| 06            | 12.0                                   | 8.0                                    |
| 07            | 9.0                                    | 6.7                                    |
| 08            | 9.0                                    | 5.7                                    |
| 09            | 9.0                                    | 6.7                                    |
| 10            | 7.2                                    | 7.1                                    |
| 11            | 7.2                                    | 7.1                                    |
| 12            | 9.0                                    | 6.7                                    |
| 13            | 9.0                                    | 6.7                                    |
| 14            | 9.0                                    | 6.7                                    |



# Revision of the Public Safety Guideline, 1982

In 1982, a re-examination was made of the public safety program to determine if another factor could better explain the differences in expenditures among institutions. A new factor, the "Urban Factor", was introduced. This factor provides additional funding for institutions in Baltimore. The new Public Safety Guideline for FY 1983 is listed in Appendix B in Table B-9. The guideline amounts by institution are listed in Table 6. FY 1984 guidelines with inflation adjustments are listed in Appendix B as Table B-10.

TABLE 6.

Revised FY 1983 Public Safety Guideline

Cost = \$69,735 + \$0.30 (GSP) + \$3.15 (average of FY 1981 and FY 1983 FTEs) + \$80,000 (UR), where UR = 1, if Urban; 0, otherwise.

| <u>Institution</u>                       | <u>FY 1983<br/>Adjusted<br/>Appropriation</u> | <u>Guideline<br/>Amount</u> | <u>Adjusted<br/>Appropriation<br/>as a % of<br/>Guideline</u> |
|------------------------------------------|-----------------------------------------------|-----------------------------|---------------------------------------------------------------|
| University of Maryland -<br>College Park | \$ 2,672,173                                  | \$2,775,272                 | 96.3%                                                         |
| Eastern Shore                            | 211,328                                       | 212,481                     | 77.6                                                          |
| Baltimore County                         | 526,566                                       | 575,565                     | 91.5                                                          |
| Bowie State College                      | 291,867                                       | 311,062                     | 94.4                                                          |
| Coppin State College                     | 328,684                                       | 330,042                     | 99.6                                                          |
| Frostburg State College                  | 368,337                                       | 433,235                     | 84.9                                                          |
| Salisbury State College                  | 300,472                                       | 308,304                     | 97.4                                                          |
| Towson State University                  | 685,766                                       | 668,654                     | 87.6                                                          |
| University of Baltimore                  | 316,959                                       | 446,515                     | 91.5                                                          |
| St. Mary's College of<br>Maryland        | 167,636                                       | 227,308                     | 73.8                                                          |
| Morgan State University                  | 574,042                                       | 496,945                     | 116.5                                                         |
| Total                                    | \$ 6,350,762                                  | \$6,746,178                 | 94.1%                                                         |

APPENDIX A  
FINANCE STUDY  
COST PROJECTIONS USING BUDGET GUIDELINES  
FY 1977 FORMULAE

In order to reasonably assess the financial needs of higher education in Maryland during the next several years, extensive effort was devoted to the development of a cost projection model to be used for this purpose. This Appendix discusses the development of the techniques used for making the cost projections presented in this report.

Development of Budget Guidelines  
For Making Cost Projections

The main requirements for a cost projection model appropriate for the purposes of this study appeared to be: (1) that it be applicable to most budget categories which are jointly supported by State general funds and student fees; (2) that it be flexible enough to permit cost projections to be made under a variety of differing assumptions about such factors as enrollment levels, average class sizes, average teaching loads, salary levels, and inflation rates; (3) that it take into account quantitative data to the maximum extent practicable; and, (4) that it permit comparability among segments for similar activities while at the same time providing for differences in functions. As a starting point in the development of a State cost projection model, budgeting models in other states were reviewed to determine to what extent they met these requirements. The approaches which appeared to be most appropriate were the formula or guideline budgeting methods used to some extent in about half the states. These methods, to varying degrees, assign costs to institutional activities based on mathematical formulas.



Certain characteristics of state formulas indicate the difficulty of directly utilizing any specific approach for this study. Because formulas and guidelines tend to differ from state to state, even when similar approaches are used, it was apparent that the method used would have to be based to a large extent on local characteristics. Those formulas and guidelines which were highly complex appeared for a number of reasons to be inappropriate for the purposes of this study. First, highly complex formulas and guidelines required extensive and long-term cost analysis. Second, Maryland lacks the uniform cost accounting procedures that would be required to support these complex approaches. Finally, the purpose of this study was to develop a flexible and general projection model, rather than one that was rigid and detailed. Those formulas which were quite general, on the other hand, did not provide enough detail to permit an understanding of how costs in different categories behaved under differing conditions and tended not to provide sufficient documentation to permit an assessment of their reasonableness. As an alternative to using only a single State's formula or guidelines directly and to developing formulas of either extreme complexity or generality, an eclectic approach was undertaken in the development of a cost projection model. It was decided to incorporate appropriate features of other state's formulas or guidelines which appeared to be reasonably consistent from state to state and to develop a projection model of moderate quantitative complexity. It was hoped that this would permit the cost projection model to incorporate the strengths of formulas and guidelines used in other states while avoiding some of the disadvantages that the extreme approaches tend to have.

The model developed for this study is most appropriately termed a guideline rather than a formula approach. This is because an attempt was made to derive an average cost of each activity for segments of institutions rather than to deal with the unique characteristics at each institution which contributed to variation in expenditure patterns. For the most part, however, expenditure patterns were consistent enough from institution to institution to allow reasonable estimates of activity costs to be obtained.

#### Instruction

The instructional component of the model was extensively researched due to its importance and complexity. Review of historical data and of formulas and guidelines used in other states identified several factors which were influential in determining instructional costs. It was decided that these could appropriately be considered in estimating costs for the instructional component of the cost projection model. The factors which were used are explained below.

Type of Instruction. Formulas and guidelines in several states recognize a difference in costs based on differences in instructional methodology employed. Some subject areas tend to require a good deal more contact between instructor and student and a good deal more time in laboratory-type instruction than do others. On the other hand, some subjects lend themselves to relatively larger lecture situations and less personal student-faculty contact.



Level of Instruction. Most state formulas recognize that different costs are associated with different levels of instruction. Instruction at advanced levels of study tends to require relatively greater faculty-student contact and more in-depth concentration than do lower levels of study.

Class Size. Class size is to a large extent a function of the method of instruction that is appropriate for any given subject area and of the level at which instruction is provided. Several states use some measure related to average class size for different subject areas and levels of instruction as the basis for estimating costs.

Teaching Load. Teaching loads also tend to vary to some extent by subject area and by level of instruction. Laboratory-type instruction and higher levels of study require greater amounts of faculty time for preparation and for individual contact with students. This tends to decrease the formal teaching load. Several states use a measure related to faculty teaching load by subject area and by level of instruction as the basis for estimating instructional costs.

Faculty Salaries. Salary levels vary both with rank and experience. They tend to exert their greatest influence on costs for different levels of study due to the fact that faculty with higher rank and more experience tend to teach advanced students. There also tends to be some salary variation among disciplines due to differences in demand in the academic job market.

Operating Costs. Different subjects have different levels of operating costs due to varying requirements for equipment and supplies. Therefore, in disciplines in which relatively high costs are incurred for equipment and supplies, the proportion of the instructional budget used for faculty salaries is lower than in disciplines with lower operating costs.

The above factors were combined mathematically to arrive at instructional cost estimates. It was decided that credit hours would be used as the basis for estimating instructional costs in order to take into account credit hours generated in all subject areas - for both majors and non-majors taking courses. Using historical data, faculty salaries, operating expenses, teaching loads, and class sizes were averaged for different areas of study and for four levels of instruction. The areas of study were grouped into major subject area categories. The levels of instruction studied were lower division, upper division, graduate, and graduate research. The following formula was used as the basis for relating the above factors to one another.

$$\text{Credit hour cost} = \frac{\text{Teaching Load} \times \text{Average Class Size} \times \text{\% of Instructional Budget for Faculty Salaries}}{\text{Average Faculty Salary}}$$

In this formula, credit hour costs increase with an increase in faculty salary or with any decrease in teaching load, class size, or the percentage of the instructional budget devoted to faculty salary (i.e., an increase in the percentage spend for operating expenses). The result was a set of costs for each major subject area and for each of the four levels of instruction offered in each area.

The results made it possible to classify disciplines according to their relative costs. As expected, these costs tended to correspond reasonably well with the type of instructional methodology which was employed. It was thus possible to classify academic programs into three groups representing similar types of instruction and costs. These categories are shown in Table A - 1.



TABLE A -1

Assignment of Programs in Major HEGIS Categories  
to Type of Instruction

1. High Laboratory Intensity
  - 0100 Agriculture and Natural Resources
  - 0200 Architecture and Environmental Design
  - 0900 Engineering
  - 1200 Health Professions
  - 1900 Physical Sciences
  
2. Mixed Laboratory - Lecture
  - 0400 Biological Sciences
  - 0600 Communications
  - 0700 Computer and Information Sciences
  - 0800 Education
  - 1000 Fine and Applied Arts
  - 1100 Foreign Languages
  - 1300 Home Economics
  - 1400 Law
  - 1500 Letters
  - 1600 Library Science
  - 1700 Mathematics
  - 4900 Interdisciplinary Studies
  
3. High Lecture Intensity
  - 0300 Area Studies
  - 0500 Business and Management
  - 2000 Psychology
  - 2100 Public Affairs and Services
  - 2200 Social Sciences

The lowest average instructional costs generally were found to be associated with lower division courses taught primarily using lecture methodology. In order to facilitate cost comparisons between different years and with other states, the average costs for other categories were divided by this lowest cost. The result was a set of relative weights which express instructional costs as a multiple of the lowest cost (which was set equal to 1.0). This set of relative weights is shown in Table A-2. As indicated by Table A-2, a graduate credit hour in a program relying primarily on lecture methodology costs on the

average of about 2.4 times as much as one at the lower division level. Likewise, a credit hour at the lower division in a laboratory intensive program costs 2.5 times as much as one in a lecture-intensive subject area.

TABLE A-2

Relative Costs Per Credit Hour for Instruction

| <u>Instructional Methodology</u> | <u>Lower Division</u> | <u>Upper Division</u> | <u>Graduate</u> | <u>Graduate Research</u> |
|----------------------------------|-----------------------|-----------------------|-----------------|--------------------------|
| High Lab                         | 2.5                   | 3.2                   | 6.0             | 20.0                     |
| Mixed Lab-Lecture                | 1.5                   | 1.9                   | 3.6             | 12.0                     |
| High Lecture                     | 1.0                   | 1.2                   | 2.4             | 8.0                      |

In order to make cost comparisons with formulas employed by other states, it was also necessary to weight their costs in terms of the lowest cost credit hour. Such comparisons indicate that the relative weights shown in Table A-2 reasonably approximate estimates made in many of the formulas employed by other states.

This approach has the additional advantage that it provides for ease in estimating costs and projecting them under differing assumptions. Using the formula for determining credit hour costs, the cost for only the lower division -- lecture-intensive category (weight equals 1.0) has to be determined. Costs for other categories can then be estimated by multiplying the various cost weights by this estimate. To determine total instructional costs, the cost per credit hour in each category is multiplied by the number of credit hours projected for each category.

In order to approximate the appropriation for FY 1977, the following factors were used to estimate credit hour costs in the lowest cost category. It was assumed that a course at the lower division



level in a lecture-intensive subject area on the average would be taught by an assistant professor earning \$15,000 annually. It was further assumed that the statewide average for such a faculty member was a teaching load of 24 hours per year with an average class size of 30. Also, the percent of the instructional budget devoted to faculty salaries at such a level and in such a discipline was estimated to be 85 percent. The credit hour cost is given by the following formula.

$$\begin{aligned} \text{Credit Hour Cost} &= \frac{\text{Annual Faculty Salary}}{\text{Teaching Load} \times \text{Class Size} \times \% \text{ of Instructional Budget for Faculty Salaries}} \\ &= \frac{\$15,000}{24 \times 30 \times .85} \\ &= \$24.51 \end{aligned}$$

When this Cost is multiplied by the cost weights for the other categories, the following estimates of cost results:

| Type of Instruction | Level of Instruction |                |          |                   |
|---------------------|----------------------|----------------|----------|-------------------|
|                     | Lower Division       | Upper Division | Graduate | Graduate Research |
| Laboratory          | \$61.27              | \$78.43        | \$147.06 | \$490.20          |
| Mixed Lab-Lecture   | 36.76                | 46.57          | 88.24    | 294.12            |
| Lecture             | 24.51                | 29.41          | 58.82    | 196.08            |

This approach allows cost estimates to be made by varying any of the factors in the formula and then multiplying the resulting costs by the weights. For example, the costs associated with an increase in quality through a decrease in average class size would be computed as follows:

$$\text{Credit Hour Cost} = \frac{\$15,000}{24 \times 25 \times .85}$$

$$= \$29.41$$

\* Class Size = 25 instead of 30

| Type of Instruction | Level of Instruction |                |          | Graduate Research |
|---------------------|----------------------|----------------|----------|-------------------|
|                     | Lower Division       | Upper Division | Graduate |                   |
| Laboratory          | \$73.53              | \$94.12        | \$176.47 | \$588.24          |
| Mixed Lab-Lecture   | 44.12                | 55.88          | 105.88   | 352.94            |
| Lecture             | 29.41                | 35.29          | 70.59    | 235.29            |

Likewise, the changes in instructional costs which would occur with changes in faculty salaries, in teaching loads, or in operating expenses could also be calculated.

#### General Administration

General administration expenditures deal with administrative costs associated with the operation of the entire institution. Most state formulas and guidelines relate the level of costs for this activity to the size of the instructional budget. Historical data indicated that costs for administration could be estimated as a percentage of the instructional budget. It was found that the best estimates could be obtained if this percentage varied with institutional size to take into account differences in economies of scale. The mathematical formula used to obtain the best fit to historical data was:  $\% = 8.6 + 24,800 / \text{FTE}$  (up to 27). The percentage it yields for institutions are indicated below.

| Size in FTE's | % of Instructional Budget Added for Administration |
|---------------|----------------------------------------------------|
| 1,000         | 27.0                                               |
| 3,000         | 16.9                                               |
| 5,000         | 13.6                                               |
| 7,000         | 12.1                                               |
| 9,000         | 11.4                                               |
| 11,000        | 10.9                                               |
| 13,000        | 10.5                                               |
| 20,000        | 9.4                                                |



Thus, if an institution had an instructional budget of \$1,000,000 and had 7,000 FTE students, this formula would estimate its administrative expenses to be about \$121,000.

#### Public Safety

This category was not as commonly found as a separate item in the formulas of other states as were the other guideline categories. An analysis of historical data indicated that a reasonable estimate of costs for public safety could be obtained by a mathematical formula which provided for decreasing unit costs (costs per FTE student) as institutional size increased. The formula which is used to approximate the FY 1977 appropriation is:  $\text{Cost/FTE} = 49.5 + 51975/\text{FTE}$ . This yields the following costs for FY 1977 data.

| <u>Size in FTE's</u> | <u>Cost per Full Time Equivalent Student</u> |
|----------------------|----------------------------------------------|
| 1,000                | 101.48                                       |
| 3,000                | 66.82                                        |
| 5,000                | 59.90                                        |
| 7,000                | 56.93                                        |
| 9,000                | 55.28                                        |
| 11,000               | 54.23                                        |
| 13,000               | 53.50                                        |
| 30,000               | 51.23                                        |

#### Student Services

Other states use a variety of approaches to estimate costs in this category, but most are related to some measure of the number of students on campus. Historical data indicated that costs in this category could be estimated using a method similar to that used by public safety -- decreasing unit costs with increasing institutional size. The formula with approximates the FY 1977 appropriation in this category

ry (excluding funds for student financial aid) is the following:

$$\text{Cost/FTE} = 185 + 51900/\text{FTE}.$$

This results in the following costs.

| <u>Size in FTE's</u> | <u>Cost per Full Time Equivalent Student</u> |
|----------------------|----------------------------------------------|
| 1,000                | 236.90                                       |
| 3,000                | 202.30                                       |
| 5,000                | 195.38                                       |
| 7,000                | 192.41                                       |
| 9,000                | 190.77                                       |
| 11,000               | 189.72                                       |
| 13,000               | 188.99                                       |
| 30,000               | 186.73                                       |

#### Libraries

While there is wide variety in the approaches used by other states to estimate library costs, most use the number of students or the proportions of students at various levels of study as a factor in their formula. It was found that reasonable estimates could be obtained by taking both student credit hours and level of study into consideration. The formulas for approximating the FY1977 appropriations yield the following costs estimated.

#### COST PER CREDIT HOUR

| <u>Size of Institution (Total Credit Hours)</u> | <u>Undergrad</u> | <u>Grad</u> | <u>Grad Research</u> |
|-------------------------------------------------|------------------|-------------|----------------------|
| 30,000                                          | 9.54             | 28.43       | 47.72                |
| 90,000                                          | 5.81             | 17.42       | 29.04                |
| 150,000                                         | 5.06             | 15.18       | 25.30                |
| 210,000                                         | 4.74             | 14.22       | 23.70                |
| 270,000                                         | 4.56             | 13.69       | 22.81                |
| 330,000                                         | 4.45             | 13.35       | 22.24                |
| 390,000                                         | 4.37             | 13.11       | 21.85                |
| 750,000                                         | 4.16             | 12.49       | 20.82                |



### Plant Operation and Maintenance

Other states generally use quite complex formulas to determine costs for this category. Most use square feet of building space as a factor. The approximation to the FY 1977 appropriation is provided by the following formula:

$$\text{Total Cost} = \$2.32 \times \text{Gross Square Feet Maintained}$$

### Inflation Rates Used for Projecting Costs

In order to project costs through FY 1982, the following annual inflation rates were applied to the guideline formulas beginning with FY 1978. A composite inflation rate of 6.5% resulted.

1. Instruction. Faculty salaries were increased by 6% per year over the FY 1977 levels.
2. Libraries. Total costs for library operations were increased by 7% per year over the FY 77 levels.
3. Plant Operation and Maintenance. Costs per gross square foot were increased by 8% annually over the FY 77 rate.
4. Student Services and Public Safety. Costs for these categories were increased by 6% annually.
5. General Administration. This category was inflated automatically as the instructional budget increased.

# APPENDIX B

Table B-1  
Budget Guidelines

FY 1977

## I. Instruction:

|               |                                          | <u>Cost per credit hour by level of instruction</u> |                   |          |          |
|---------------|------------------------------------------|-----------------------------------------------------|-------------------|----------|----------|
| HEGIS<br>Code | Instruction Method                       | Lower<br>Division                                   | Upper<br>Division | Graduate |          |
|               |                                          | Undergraduate                                       | Undergraduate     | Graduate | Research |
|               | High Laboratory Intensity                | \$61.27                                             | \$78.43           | \$147.06 | \$490.20 |
| 0100          | Agriculture & Natural Resources          |                                                     |                   |          |          |
| 0200          | Architecture and Environmental<br>Design |                                                     |                   |          |          |
| 0900          | Engineering                              |                                                     |                   |          |          |
| 1200          | Health Professions                       |                                                     |                   |          |          |
| 1900          | Physical Sciences<br>Remedial Work       |                                                     |                   |          |          |
|               | Mixed Laboratory-Lecture                 | \$36.76                                             | \$46.57           | \$ 88.24 | \$294.12 |
| 0400          | Biological Sciences                      |                                                     |                   |          |          |
| 0600          | Communications                           |                                                     |                   |          |          |
| 0700          | Computer & Information Sciences          |                                                     |                   |          |          |
| 0800          | Education                                |                                                     |                   |          |          |
| 1000          | Fine and Applied Arts                    |                                                     |                   |          |          |
| 1100          | Foreign Languages                        |                                                     |                   |          |          |
| 1300          | Home Economics                           |                                                     |                   |          |          |
| 1400          | Law                                      |                                                     |                   |          |          |
| 1500          | Letters                                  |                                                     |                   |          |          |
| 1600          | Library Sciences                         |                                                     |                   |          |          |
| 1700          | Mathematics                              |                                                     |                   |          |          |
| 4900          | Interdisciplinary Studies                |                                                     |                   |          |          |
|               | High Lecture Intensity                   | \$24.51                                             | \$29.41           | \$ 58.82 | \$196.08 |
| 0300          | Area Studies                             |                                                     |                   |          |          |
| 0500          | Business and Management                  |                                                     |                   |          |          |
| 2000          | Psychology                               |                                                     |                   |          |          |
| 2100          | Public Affairs and Services              |                                                     |                   |          |          |
| 2200          | Social Sciences                          |                                                     |                   |          |          |

II. Administration - Administrative costs are calculated as a percent of the instruction - budget calculated above:

$$((248)\text{FTE}) + .086) \times (\text{Instruction Cost}) = \% \text{ of instruction budget.}$$

III. Public Safety:

$$\$51,975 + (\$49.50 \times \text{FTE}).$$

IV. Student Services:

$$\$51,900 + (\$185 \times \text{FTE}).$$

V. Library:

$$((168,130/\text{Total Credit Hours}) + 3.5390 \times (\text{Undergrad Credit Hours}) + 3 (\text{Graduate Credit Hours}) + 5 (\text{Graduate Research Credit Hours}).$$

VI. Plant Operation:

$$\$2.32 \times (\text{non-auxiliary GSF}).$$



# APPENDIX B

Table B-2  
Budget Guidelines

FY 1978

## I. Instruction:

|                   |                                       | <u>Cost per credit hour by level of instruction</u> |                       |                 |                 |
|-------------------|---------------------------------------|-----------------------------------------------------|-----------------------|-----------------|-----------------|
| <u>HEGIS Code</u> | <u>Instruction Method</u>             | <u>Lower Division</u>                               | <u>Upper Division</u> | <u>Graduate</u> |                 |
|                   |                                       | <u>Undergraduate</u>                                | <u>Undergraduate</u>  | <u>Graduate</u> | <u>Research</u> |
|                   | High Laboratory Intensity             | \$64.95                                             | \$83.15               | \$155.88        | \$519.60        |
| 0100              | Agriculture and Natural Resources     |                                                     |                       |                 |                 |
| 0200              | Architecture and Environmental Design |                                                     |                       |                 |                 |
| 0900              | Engineering                           |                                                     |                       |                 |                 |
| 1200              | Health Professions                    |                                                     |                       |                 |                 |
| 1900              | Physical Sciences                     |                                                     |                       |                 |                 |
|                   | Mixed Laboratory + Lecture            | \$38.97                                             | \$49.36               | \$ 93.53        | \$311.78        |
| 0400              | Biological Sciences                   |                                                     |                       |                 |                 |
| 0600              | Communications                        |                                                     |                       |                 |                 |
| 0700              | Computer & Information Sciences       |                                                     |                       |                 |                 |
| 0800              | Education                             |                                                     |                       |                 |                 |
| 1000              | Fine and Applied Arts                 |                                                     |                       |                 |                 |
| 1100              | Foreign Languages                     |                                                     |                       |                 |                 |
| 1300              | Home Economics                        |                                                     |                       |                 |                 |
| 1400              | Law                                   |                                                     |                       |                 |                 |
| 1500              | Letters                               |                                                     |                       |                 |                 |
| 1600              | Library Sciences                      |                                                     |                       |                 |                 |
| 1700              | Mathematics                           |                                                     |                       |                 |                 |
| 4900              | Interdisciplinary Studies             |                                                     |                       |                 |                 |
|                   | High Lecture Intensity                | \$25.98                                             | \$31.17               | \$ 62.35        | \$207.84        |
| 0300              | Area Studies                          |                                                     |                       |                 |                 |
| 0500              | Business and Management               |                                                     |                       |                 |                 |
| 2000              | Psychology                            |                                                     |                       |                 |                 |
| 2100              | Public Affairs and Services           |                                                     |                       |                 |                 |
| 2200              | Social Sciences                       |                                                     |                       |                 |                 |

## II. Administration:

Administrative costs are assumed to be a certain percent of the instruction budget as calculated above. The administrative costs as a percent of the instruction budget are expected to decline as the number of full-time equivalent student increase.

$$((248/\text{FTE}) + .086) \times (\text{Instruction Cost})$$

## III. Public Safety:

$$55093 + (52.47 \times \text{FTE})$$

## IV. Student Services:

$$55014 + (196.1 \times \text{FTE})$$

## V. Library:

$$((179,899/\text{Total Credit Hours}) + 4.2147) \times (\text{Undergrad Credit Hours}) + 3 (\text{Graduate Credit Hours})$$

## VI. Plant Operation:

$$2.51 \times \text{gross square feet} - \text{non-auxiliary.}$$

# APPENDIX B

Table B-3  
Budget Guidelines

FY 1979

## I. Instruction:

|                   |                                     | <u>Cost per credit hour by level of instruction</u> |                       |                 |                 |
|-------------------|-------------------------------------|-----------------------------------------------------|-----------------------|-----------------|-----------------|
| <u>HEGIS Code</u> | <u>Instruction Method</u>           | <u>Lower Division</u>                               | <u>Upper Division</u> | <u>Graduate</u> |                 |
|                   |                                     | <u>Undergraduate</u>                                | <u>Undergraduate</u>  | <u>Graduate</u> | <u>Research</u> |
|                   | High Laboratory Intensity           | \$68.85                                             | \$88.13               | \$165.23        | \$550.79        |
| 0100              | Agriculture & Natural Resources     |                                                     |                       |                 |                 |
| 0200              | Architecture & Environmental Design |                                                     |                       |                 |                 |
| 0300              | Engineering                         |                                                     |                       |                 |                 |
| 1200              | Health Professions                  |                                                     |                       |                 |                 |
| 1900              | Physical Sciences                   |                                                     |                       |                 |                 |
|                   | Remedial Work                       |                                                     |                       |                 |                 |
|                   | Mixed Laboratory - Lecture          | \$41.31                                             | \$52.32               | \$ 99.14        | \$330.48        |
| 0400              | Biological Sciences                 |                                                     |                       |                 |                 |
| 0600              | Communications                      |                                                     |                       |                 |                 |
| 0700              | Computer & Information Sciences     |                                                     |                       |                 |                 |
| 0800              | Education                           |                                                     |                       |                 |                 |
| 1000              | Fine and Applied Arts               |                                                     |                       |                 |                 |
| 1100              | Foreign Languages                   |                                                     |                       |                 |                 |
| 1300              | Home Economics                      |                                                     |                       |                 |                 |
| 1400              | Law                                 |                                                     |                       |                 |                 |
| 1500              | Letters                             |                                                     |                       |                 |                 |
| 1600              | Library Sciences                    |                                                     |                       |                 |                 |
| 1700              | Mathematics                         |                                                     |                       |                 |                 |
| 4900              | Interdisciplinary Studies           |                                                     |                       |                 |                 |
|                   | High Lecture Intensity              | \$27.54                                             | \$33.04               | \$ 66.09        | \$220.31        |
| 0300              | Area Studies                        |                                                     |                       |                 |                 |
| 0500              | Business and Management             |                                                     |                       |                 |                 |
| 2000              | Psychology                          |                                                     |                       |                 |                 |
| 2100              | Public Affairs and Services         |                                                     |                       |                 |                 |
| 2200              | Social Sciences                     |                                                     |                       |                 |                 |

## II. Administration:

Administrative costs are assumed to be a certain percent of the instruction budget as calculated above. The administrative costs as a percent of the instruction budget are expected to decline as the number of full-time equivalent student increase.

$$((248/\text{FTE}) + .086) \times (\text{Instruction Cost})$$

## III. Public Safety:

$$58398 + (55.62 \times \text{FTES})$$

## IV. Student Services:

$$58315 + (208 \times \text{FTES})$$

## V. Library:

$$((190693/\text{Total Credit Hours}) + 4.4676) \times (\text{Undergrad Credit Hours}) + 3 (\text{Graduate Credit Hours}) + 5 (\text{Graduate Research Credit Hours})$$

## VI. Plant Operation:

$$2.66 \times \text{gross square feet} - \text{non-auxiliary.}$$



# APPENDIX B

Table B-4  
Budget Guidelines

## I. Instruction:

| HEGIS<br>Code | Instruction Method                     | <u>Cost per credit hour by level of instruction</u> |                                    |          |                      |
|---------------|----------------------------------------|-----------------------------------------------------|------------------------------------|----------|----------------------|
|               |                                        | Lower<br>Division<br>Undergraduate                  | Upper<br>Division<br>Undergraduate | Graduate | Graduate<br>Research |
|               | High Laboratory Intensity              | \$73.33                                             | \$93.86                            | \$175.97 | \$733.25             |
| 0100          | Agriculture & Natural Resources        |                                                     |                                    |          |                      |
| 0200          | Architecture & Environmental<br>Design |                                                     |                                    |          |                      |
| 0900          | Engineering                            |                                                     |                                    |          |                      |
| 1200          | Health Professions                     |                                                     |                                    |          |                      |
| 1900          | Physical Sciences                      |                                                     |                                    |          |                      |
|               | Remedial Work                          |                                                     |                                    |          |                      |
|               | Mixed Laboratory - Lecture             | \$44.00                                             | \$55.72                            | \$105.58 | \$439.94             |
| 0400          | Biological Sciences                    |                                                     |                                    |          |                      |
| 0600          | Communications                         |                                                     |                                    |          |                      |
| 0700          | Computer & Information Sciences        |                                                     |                                    |          |                      |
| 0800          | Education                              |                                                     |                                    |          |                      |
| 1000          | Fine and Applied Arts                  |                                                     |                                    |          |                      |
| 1100          | Foreign Languages                      |                                                     |                                    |          |                      |
| 1300          | Home Economics                         |                                                     |                                    |          |                      |
| 1400          | Law                                    |                                                     |                                    |          |                      |
| 1500          | Letters                                |                                                     |                                    |          |                      |
| 1600          | Library Sciences                       |                                                     |                                    |          |                      |
| 1700          | Mathematics                            |                                                     |                                    |          |                      |
| 4900          | Interdisciplinary Studies              |                                                     |                                    |          |                      |
|               | High Lecture Intensity                 | \$29.33                                             | \$35.19                            | \$ 70.39 | \$293.31             |
| 0300          | Area Studies                           |                                                     |                                    |          |                      |
| 0500          | Business and Management                |                                                     |                                    |          |                      |
| 2000          | Psychology                             |                                                     |                                    |          |                      |
| 2100          | Public Affairs and Services            |                                                     |                                    |          |                      |
| 2200          | Social Sciences                        |                                                     |                                    |          |                      |

## II. Administration:

$$((248/\text{FTE}) + .086 \times (\text{Instruction Cost}))$$

## III. Public Safety:

$$\$62195 + (59.24 \times \text{FTES})$$

## IV. Student Services:

$$\$62,104 + (221.38 \times \text{FTES})$$

## V. Library:

$$((\$203,088/\text{Total Credit Hours}) + 4.76) \times (\text{Undergraduate Credit Hours}) + (3 \times \text{Graduate Credit Hours}) + (5 \times \text{Graduate Research Credit Hours})$$

## VI. Plant Operation:

$$\$2.83 \times \text{CSF.}$$

# APPENDIX B

Table B-5

## Budget Guidelines With Salary Increase

FY 1980

### I. Instruction:

|                             |                                        | <u>Cost per credit hour by level of instruction</u> |                                         |                 |                 |
|-----------------------------|----------------------------------------|-----------------------------------------------------|-----------------------------------------|-----------------|-----------------|
| <u>HEGIS</u><br><u>Code</u> | <u>Instruction Method</u>              | <u>Lower</u>                                        | <u>Upper</u>                            | <u>Graduate</u> |                 |
|                             |                                        | <u>Division</u><br><u>Undergraduate</u>             | <u>Division</u><br><u>Undergraduate</u> | <u>Graduate</u> | <u>Research</u> |
|                             | High Laboratory Intensity              | \$77.04                                             | \$88.62                                 | \$184.92        | \$770.50        |
| 0100                        | Agriculture & Natural Resources        |                                                     |                                         |                 |                 |
| 0200                        | Architecture & Environmental<br>Design |                                                     |                                         |                 |                 |
| 0900                        | Engineering                            |                                                     |                                         |                 |                 |
| 1200                        | Health Professions                     |                                                     |                                         |                 |                 |
| 1900                        | Physical Sciences<br>Remedial Work     |                                                     |                                         |                 |                 |
|                             | Mixed Laboratory - Lecture             | \$46.23                                             | \$58.56                                 | \$110.95        | \$462.30        |
| 0400                        | Biological Sciences                    |                                                     |                                         |                 |                 |
| 0600                        | Communications                         |                                                     |                                         |                 |                 |
| 0700                        | Computer & Information Sciences        |                                                     |                                         |                 |                 |
| 0800                        | Education                              |                                                     |                                         |                 |                 |
| 1000                        | Fine and Applied Arts                  |                                                     |                                         |                 |                 |
| 1100                        | Foreign Languages                      |                                                     |                                         |                 |                 |
| 1300                        | Home Economics                         |                                                     |                                         |                 |                 |
| 1400                        | Law                                    |                                                     |                                         |                 |                 |
| 1500                        | Letters                                |                                                     |                                         |                 |                 |
| 1600                        | Library Sciences                       |                                                     |                                         |                 |                 |
| 1700                        | Mathematics                            |                                                     |                                         |                 |                 |
| 4900                        | Interdisciplinary Studies              |                                                     |                                         |                 |                 |
|                             | High Lecture Intensity                 | \$30.82                                             | \$36.98                                 | \$ 73.97        | \$308.20        |
| 0300                        | Area Studies                           |                                                     |                                         |                 |                 |
| 0500                        | Business and Management                |                                                     |                                         |                 |                 |
| 2000                        | Psychology                             |                                                     |                                         |                 |                 |
| 2100                        | Public Affairs and Services            |                                                     |                                         |                 |                 |
| 2200                        | Social Sciences                        |                                                     |                                         |                 |                 |

### II. Administration:

Administrative costs are assumed to be a certain percent of the instruction budget as calculated above. The administrative costs as a percent of the instruction budget are expected to decline as the number of full-time equivalent student increase.

$$((246.28/\text{FTE}) + .0854) \times (\text{Instruction cost})$$

### III. Public Safety:

$$65547 + (62.43 \times \text{FTES})$$

### IV. Student Services:

$$64675 + (230.55 \times \text{FTES})$$

### V. Library:

$$((209343/\text{Total Credit Hours}) + 4.91) \times (\text{Undergrad Credit Hours} + 3 (\text{Graduate Credit Hours}) + 5 (\text{Graduate Research Credit Hours}))$$

### VI. Plant Operation:

$$2.90 \times \text{gross square feet} - \text{non-auxiliary.}$$



# APPENDIX B

Table B- 6

## Budget Guidelines

Without Salary Increase

FY 1981

### I. Instruction:

|            |                                     | Cost per credit hour by level of instruction |                |          |          |
|------------|-------------------------------------|----------------------------------------------|----------------|----------|----------|
| HEGIS Code | Instruction Method                  | Lower Division                               | Upper Division | Graduate |          |
|            |                                     | Undergraduate                                | Undergraduate  | Graduate | Research |
|            | High Laboratory Intensity           | \$81.38                                      | \$104.61       | \$195.30 | \$813.75 |
| 0100       | Agriculture & Natural Resources     |                                              |                |          |          |
| 0200       | Architecture & Environmental Design |                                              |                |          |          |
| 0900       | Engineering                         |                                              |                |          |          |
| 1200       | Health Professions                  |                                              |                |          |          |
| 1900       | Physical Sciences                   |                                              |                |          |          |
|            | Remedial Work                       |                                              |                |          |          |
|            | Mixed Laboratory - Lecture          | \$48.83                                      | \$ 61.95       | \$117.18 | \$488.25 |
| 0400       | Biological Sciences                 |                                              |                |          |          |
| 0600       | Communications                      |                                              |                |          |          |
| 0700       | Computer & Information Sciences     |                                              |                |          |          |
| 0800       | Education                           |                                              |                |          |          |
| 1000       | Fine and Applied Arts               |                                              |                |          |          |
| 1100       | Foreign Languages                   |                                              |                |          |          |
| 1300       | Home Economics                      |                                              |                |          |          |
| 1400       | Law                                 |                                              |                |          |          |
| 1500       | Letters                             |                                              |                |          |          |
| 1600       | Library Sciences                    |                                              |                |          |          |
| 1700       | Mathematics                         |                                              |                |          |          |
| 4900       | Interdisciplinary Studies           |                                              |                |          |          |
|            | High Lecture Intensity              | \$32.55                                      | \$ 39.06       | \$ 78.12 | \$325.50 |
| 0300       | Area Studies                        |                                              |                |          |          |
| 0500       | Business and Management             |                                              |                |          |          |
| 2000       | Psychology                          |                                              |                |          |          |
| 2100       | Public Affairs and Services         |                                              |                |          |          |
| 2200       | Social Sciences                     |                                              |                |          |          |

### II. Administration:

$((236.75/\text{FTE}) + .084) \times \text{Instruction Budget}$

### III. Library:

$((217,812/\text{Total Credit Hours}) + \$5.11) \times (\text{Undergraduate Credit Hours}) + 3 (\text{Graduate Credit Hours}) + 5 (\text{Graduate Research Credit Hours})$

### IV. Student Services

$\$67,074 + (\$239.10 \times \text{FTE})$

### V. Public Safety:

$\$67,948 + (\$64.72 \times \text{FTE})$

### VI. Plant Operation and Maintenance

$\$3.35 \times \text{GSF}$

# APPENDIX B

Table B-7

## Budget Guidelines

With Salary Increase

### I. Instruction: FY 1981

|                   |                                     | <u>Cost per credit hour by level of instruction</u> |                       |                 |                 |
|-------------------|-------------------------------------|-----------------------------------------------------|-----------------------|-----------------|-----------------|
| <u>HEGIS Code</u> | <u>Instruction Method</u>           | <u>Lower Division</u>                               | <u>Upper Division</u> | <u>Graduate</u> |                 |
|                   |                                     | <u>Undergraduate</u>                                | <u>Undergraduate</u>  | <u>Graduate</u> | <u>Research</u> |
|                   | High Laboratory Intensity           | \$85.46                                             | \$109.86              | \$205.09        | \$854.56        |
| 0100              | Agriculture & Natural Resources     |                                                     |                       |                 |                 |
| 0200              | Architecture & Environmental Design |                                                     |                       |                 |                 |
| 0900              | Engineering                         |                                                     |                       |                 |                 |
| 1200              | Health Professions                  |                                                     |                       |                 |                 |
| 1900              | Physical Sciences                   |                                                     |                       |                 |                 |
|                   | Remedial Work                       |                                                     |                       |                 |                 |
|                   | Mixed Laboratory - Lecture          | \$51.28                                             | \$ 64.95              | \$123.06        | \$512.74        |
| 0400              | Biological Sciences                 |                                                     |                       |                 |                 |
| 0600              | Communications                      |                                                     |                       |                 |                 |
| 0700              | Computer & Information Sciences     |                                                     |                       |                 |                 |
| 0800              | Education                           |                                                     |                       |                 |                 |
| 1000              | Fine and Applied Arts               |                                                     |                       |                 |                 |
| 1100              | Foreign Languages                   |                                                     |                       |                 |                 |
| 1300              | Home Economics                      |                                                     |                       |                 |                 |
| 1400              | Law                                 |                                                     |                       |                 |                 |
| 1500              | Letters                             |                                                     |                       |                 |                 |
| 1600              | Library Sciences                    |                                                     |                       |                 |                 |
| 1700              | Mathematics                         |                                                     |                       |                 |                 |
| 4900              | Interdisciplinary Studies           |                                                     |                       |                 |                 |
|                   | High Lecture Intensity              | \$35.89                                             | \$ 43.07              | \$ 86.14        | \$358.91        |
| 0300              | Area Studies                        |                                                     |                       |                 |                 |
| 0500              | Business and Management             |                                                     |                       |                 |                 |
| 2000              | Psychology                          |                                                     |                       |                 |                 |
| 2100              | Public Affairs and Services         |                                                     |                       |                 |                 |
| 2200              | Social Sciences                     |                                                     |                       |                 |                 |

### II. Administration:

Administrative costs are assumed to be a certain percent of the instruction budget as calculated above. The administrative costs as a percent of the instruction budget are expected to decline as the number of full-time equivalent student increase.

$$((246.28/\text{FTE}) + .0854) \times (\text{Instruction Cost})$$

### III. Public Safety:

$$71356 + (67.97 \times \text{FTES})$$

### IV. Student Services:

$$70438 + (251.09 \times \text{FTES})$$

### V. Library:

$$((228735/\text{Total Credit Hours}) + 5.37) \times (\text{Undergrad Credit Hours} + 3 (\text{Graduate Credit Hours}) + 5 (\text{Graduate Research Credit Hours}))$$

### VI. Plant Operation:

$$3.52 \times \text{gross square feet} - \text{non-auxiliary}$$



TABLE B- 8  
REVISED GUIDELINES

FY 1982

INSTRUCTION GUIDELINE:

- A. Adjusted Cost = \$182,745 + 37% of (the average of 80 and 82 research dollars) + matrix (1982 credit hours)
- B. Adjusted cost = \$182,745 + 37% of (the average of 80 and 82 research dollars) + matrix (average of 80 and 82 credit hours)

Cost per Credit Hour

|             | <u>Lower<br/>Division</u> | <u>Upper<br/>Division</u> | <u>Graduate</u> | <u>Graduate<br/>Research</u> |
|-------------|---------------------------|---------------------------|-----------------|------------------------------|
| Low         | \$20.075                  | \$ 60.225                 | \$120.45        | \$160.60                     |
| Medium-Low  | 30.1125                   | 90.3375                   | 180.675         | 240.90                       |
| Medium-High | 40.15                     | 120.45                    | 240.90          | 321.20                       |
| High        | 50.1875                   | 150.5625                  | 301.125         | 401.50                       |

An institution should use the option which generates the larger guideline amount.

LIBRARY GUIDELINE:

Cost = \$201,957 + \$24.65 (5% of ALA standard EVE's) + \$1.53 x + \$555 (1980 faculty positions) + 6% of (average of 80 and 82 research dollars - \$10 M) where X = (average of 1980 and 1982 undergraduate credit hours + 3 (average of 1980 and 1982 graduate credit hours) + 5 (average of 1980 and 1982 graduate research credit hours)

PUBLIC SAFETY GUIDELINE:

Cost = \$76,315 + \$58.55 (average of 1980 and 1982 headcount)

ADMINISTRATION GUIDELINE:

Cost = \$173,007 + \$120 (average of 1980 and 1982 headcount) + \$100,139 (number of non-guideline programs).

STUDENT SERVICES GUIDELINE:

Cost = \$89,195 + \$229 (number of 1980 admissions applications) + \$75 (average of 1980 and 1982 FTES).

PLANT OPERATION AND MAINTENANCE GUIDELINE:

Cost = \$256,040 + \$153 (average of 1980 and 1982 headcount) + \$0.66 (1982 non-auxiliary GSF) + fuel.

TABLE B- 9

## REVISED FY 1983 GUIDELINES

INSTRUCTION

- A. Adjusted cost = \$195,880 + 37% of (the average of 81 and 83 research dollars) + matrix (1983 credit hours).
- B. Adjusted cost = \$195,880 + 37% of (the average of 81 and 83 research dollars) + matrix (average of 81 and 83 credit hours).

## Cost per Credit Hour

|                    |                              | <u>Lower<br/>Division</u> | <u>Upper<br/>Division</u> | <u>Graduate</u> | <u>Graduate<br/>Research</u> |
|--------------------|------------------------------|---------------------------|---------------------------|-----------------|------------------------------|
| <u>Low</u>         |                              | \$21.52                   | \$64.56                   | \$129.12        | \$172.16                     |
| 0300               | Area Studies                 |                           |                           |                 |                              |
| 0500               | Business                     |                           |                           |                 |                              |
| 0700               | Computer Science             |                           |                           |                 |                              |
| 4900               | Interdisciplinary<br>Studies |                           |                           |                 |                              |
| 1400               | Law                          |                           |                           |                 |                              |
| <u>Medium-Low</u>  |                              | \$32.28                   | \$96.84                   | \$193.68        | \$258.24                     |
| 0100               | Agriculture                  |                           |                           |                 |                              |
| 0600               | Communication                |                           |                           |                 |                              |
| 1100               | Foreign Language             |                           |                           |                 |                              |
| 1200               | Health                       |                           |                           |                 |                              |
| 1300               | Home Economics               |                           |                           |                 |                              |
| 1500               | Letters                      |                           |                           |                 |                              |
| 1700               | Mathematics                  |                           |                           |                 |                              |
| 2000               | Psychology                   |                           |                           |                 |                              |
| 2100               | Public Affairs               |                           |                           |                 |                              |
| 2200               | Social Science               |                           |                           |                 |                              |
| <u>Medium-High</u> |                              | \$43.04                   | \$129.12                  | \$258.24        | \$344.32                     |
| 0400               | Biology                      |                           |                           |                 |                              |
| 0800               | Education                    |                           |                           |                 |                              |
| 0900               | Engineering                  |                           |                           |                 |                              |
| 1000               | Fine Arts                    |                           |                           |                 |                              |
| 1900               | Physical Sciences            |                           |                           |                 |                              |
| <u>High</u>        |                              | \$53.80                   | \$161.40                  | \$322.80        | \$430.40                     |
| 0200               | Architecture                 |                           |                           |                 |                              |
| 1600               | Library Science              |                           |                           |                 |                              |
| 1203               | Nursing                      |                           |                           |                 |                              |
| 9500               | Remedial                     |                           |                           |                 |                              |



1983, Continued

ADMINISTRATION:

Cost = \$135,790 + \$129 (average of 1981 and 1983 headcount) + \$107,540 (number of non-guideline programs).

LIBRARY:

Cost = \$216,646 + \$26.44 (5% of ALA standard BVE's) + \$11,64x + \$595 (1981 faculty positions) + 6% of (average of FY 81 and FY 83 research dollars minus \$10 million)

where x = (average of 1981 and 1983 undergraduate credit hours) + 3 (average of 1981 and 1983 graduate credit hours) + 5 (average of 1981 and 1983 graduate research credit hours).

STUDENT SERVICES:

Cost = \$95,900 + \$246 (number of 1981 admissions applications) + \$81 (average of 1981 and 1983 FTES).

PUBLIC SAFETY:

Cost = \$69,735 + \$0.30 (GSF) + \$3.15 (average of 1981 and 1983 FTES) + \$80,000 (U-R)

where U-R = 1, if urban, 0, otherwise

PHYSICAL PLANT:

Cost = \$350,260 + \$290 (average of 1981 and 1983 headcount) + \$1.15 (non-auxiliary GSF) + fuel cost.

TABLE B- 10  
FY 1984 GUIDELINES

INSTRUCTION

- A. Adjusted cost = \$205,800 + 37% of (the average of 82 and 84 research dollars) + matrix (1984 credit hours).
- B. Adjusted cost = \$205,800 + 37% of (the average of 82 and 84 research dollars) + matrix (average of 82 and 84 credit hours).

Cost per Credit Hour

|      |                              | <u>Lower</u><br><u>Division</u> | <u>Upper</u><br><u>Division</u> | <u>Graduate</u> | <u>Graduate</u><br><u>Research</u> |
|------|------------------------------|---------------------------------|---------------------------------|-----------------|------------------------------------|
|      | Low                          | \$22.65                         | \$67.95                         | \$135.90        | \$181.20                           |
| 0300 | Area Studies                 |                                 |                                 |                 |                                    |
| 0500 | Business                     |                                 |                                 |                 |                                    |
| 0700 | Computer Science             |                                 |                                 |                 |                                    |
| 4900 | Interdisciplinary<br>Studies |                                 |                                 |                 |                                    |
| 1400 | Law                          |                                 |                                 |                 |                                    |
|      | Medium-Low                   | \$33.98                         | \$101.92                        | \$203.85        | \$271.80                           |
| 0100 | Agriculture                  |                                 |                                 |                 |                                    |
| 0600 | Communication                |                                 |                                 |                 |                                    |
| 1100 | Foreign Language             |                                 |                                 |                 |                                    |
| 1200 | Health                       |                                 |                                 |                 |                                    |
| 1300 | Home Economics               |                                 |                                 |                 |                                    |
| 1500 | Letters                      |                                 |                                 |                 |                                    |
| 1700 | Mathematics                  |                                 |                                 |                 |                                    |
| 2000 | Psychology                   |                                 |                                 |                 |                                    |
| 2100 | Public Affairs               |                                 |                                 |                 |                                    |
| 2200 | Social Science               |                                 |                                 |                 |                                    |
|      | Medium-High                  | \$45.30                         | \$135.90                        | \$271.80        | \$362.40                           |
| 0400 | Biology                      |                                 |                                 |                 |                                    |
| 0800 | Education                    |                                 |                                 |                 |                                    |
| 0900 | Engineering                  |                                 |                                 |                 |                                    |
| 1000 | Fine Arts                    |                                 |                                 |                 |                                    |
| 1900 | Physical Sciences            |                                 |                                 |                 |                                    |
|      | High                         | \$56.63                         | \$169.88                        | \$339.75        | \$453.00                           |
| 0200 | Architecture                 |                                 |                                 |                 |                                    |
| 1600 | Library Science              |                                 |                                 |                 |                                    |
| 1303 | Nursing                      |                                 |                                 |                 |                                    |
| 9500 | Remedial                     |                                 |                                 |                 |                                    |



1984 (continued)

ADMINISTRATION:

Cost = \$195,630 + \$136 (average of 1982 and 1984 headcount) + \$113,235 (number of non-guideline programs).

LIBRARY:

Cost = \$229,325 + \$28.00 (5% of ALA standard BVE's) + \$1.74x + \$630 (1982 faculty positions) + 6% of (average of FY 82 and FY 84 research dollars minus \$10 million)

where x = (average of 1982 and 1984 undergraduate credit hours) + 3 (average of 1982 and 1984 graduate credit hours) + 5 (average of 1982 and 1984 graduate research credit hours).

STUDENT SERVICES:

Cost = \$101,160 + \$260(number of 1982 admissions applications) + 85 (average of 1982 and 1984 FTES).

PUBLIC SAFETY:

Cost = \$73,215 + \$3.30(average of FY 82 and FY 84 FTES) + \$0.31 (GSF) + \$63,990 (UR)

where UR = 1, if urban, 0, otherwise.

PHYSICAL PLANT:

Cost = \$372,750 + \$266 (average of FY 82 and FY 84 headcount) + \$1.22 (non-auxiliary GSF) + fuel cost.

## APPENDIX C

### Revised Operating Budget Guidelines

Operating Budget guidelines for Instruction, Administration, Library, Student Services, Physical Plant, and Public Safety programs at the public four-year colleges and universities of Maryland were developed by a Committee of the SBHE in 1976. The Board has used these guidelines with minor modifications and inflationary adjustments in their review of the FY 1979 - FY 1982 MARC and Budget requests. After four years of experience with the guidelines, the staff with the concurrence of the institutions decided a review of the guidelines was in order. A task force composed of the Finance Advisory Committee and other representatives chosen by the segment heads met with SBHE staff at least once a month between May, 1980 and June, 1981 to review the guidelines.

Although it was recognized that revised guidelines could address the issues of adequacy and equity of funding, no attempt was made to determine the adequacy of total funding relative to peer institutions or to where higher education "should" be funded. A further study will be needed to address this issue. The revised guidelines were developed in the context of the funds required to maintain the existing operations at the institutions. The guidelines will be used by the Board to equitably distribute the available funds. The task force further agreed that the revised guidelines should consider the anticipated changes in enrollment during the next ten years. Finally, the guidelines were to reflect the normal operating costs of an institution; funding for program improvements and enhancements should continue to be considered outside of the guidelines.

First, the guidelines/formulas used by other states were examined, compared and contrasted. The philosophy behind use of guidelines by the other states and Maryland was discussed to establish a framework for the revision of the Board's guidelines. A summary document delineating the types of guidelines used, programs covered, and methodologies used in each state was prepared and is available as background information.



Each guideline was discussed separately, focusing on relevant data from other states and the assumptions underlying utilization of alternate formats, variables, and statistical techniques. Early meetings established that there were certain fixed and variable costs associated with each guideline program. Fixed costs were to be derived from regression analysis and were to be used to moderate abrupt changes in variable costs caused by enrollment changes.

Although it was recognized that fixed costs could vary by institution, it was determined that for each guideline program, there would be only one fixed cost component that would be the same for all institutions. That is, the instruction program fixed cost at UMCP would be the same as the fixed cost at Bowie or at Frostburg. In addition to fixed costs, there were other variables that affected expenditures; each guideline could contain one or more of these variable components.

The 1976 Guidelines are driven by projected enrollment. Given the anticipated declines in enrollment during the 1980's, it was decided that the average of the latest actual and projected year's enrollment would be used in the revised guidelines. During periods of declining enrollments, use of a two-year enrollment average (headcount, credit hours, or FTES) will spread the guideline resource reduction over several years. Some resource costs that are highly related to enrollment during growth are not as variable when enrollments decline. Number of tenured faculty, in particular, cannot be immediately reduced.

Revised guideline amounts developed from this process for FY 1982 are shown in Table C-1, together with the 1982 Legislative appropriation. Table C-2 displays the Legislative appropriation as a percent of the revised guidelines for each of the eleven guideline schools. The six revised guidelines are discussed in detail in the next section of this paper and are summarized in Table C-3.

To fund the eleven guideline institutions at the level of the revised guidelines would require \$255,128,297 for FY 1982; the legislative appropriation was \$221,076,246, 86.7 percent of the revised guideline totals. Among the insti-

TABLE C-1

1982 LEGISLATIVE APPROPRIATIONS  
AND REVISED GUIDELINE AMOUNTS

|             | Education   |                           | Administration |                           | Public Safety |                           | Student Services |                           | Library    |                           | Plant      |                           | Total       |                           |
|-------------|-------------|---------------------------|----------------|---------------------------|---------------|---------------------------|------------------|---------------------------|------------|---------------------------|------------|---------------------------|-------------|---------------------------|
|             | Proposed    | Legislative Appropriation | Proposed       | Legislative Appropriation | Proposed      | Legislative Appropriation | Proposed         | Legislative Appropriation | Proposed   | Legislative Appropriation | Proposed   | Legislative Appropriation | Proposed    | Legislative Appropriation |
| U.S.C.      | 10,419,270  | 10,136,119                | 1,427,006      | 1,453,902                 | 443,730       | 443,151                   | 1,478,111        | 1,323,038                 | 1,171,428  | 1,119,309                 | 1,768,320  | 1,756,970                 | 18,764,747  | 18,523,369                |
| U.S.P.      | 26,094,384  | 61,152,031                | 5,556,892      | 5,131,468                 | 2,211,894     | 2,345,570                 | 7,451,381        | 6,341,744                 | 7,816,045  | 6,558,902                 | 21,311,065 | 20,748,681                | 120,371,671 | 102,201,416               |
| U.S.F.      | 2,472,933   | 2,058,858                 | 809,109        | 611,933                   | 141,347       | 133,917                   | 391,474          | 261,126                   | 512,026    | 465,209                   | 1,730,846  | 1,775,066                 | 5,252,612   | 5,003,293                 |
| Bowie       | 4,433,334   | 3,629,534                 | 1,038,298      | 732,556                   | 253,977       | 274,231                   | 604,805          | 745,826                   | 633,992    | 550,806                   | 2,073,909  | 2,191,865                 | 9,428,129   | 8,124,610                 |
| Capital     | 4,753,282   | 3,609,237                 | 1,062,844      | 943,693                   | 236,706       | 281,520                   | 713,652          | 500,833                   | 652,961    | 603,134                   | 2,380,134  | 1,345,517                 | 8,736,591   | 1,401,104                 |
| Frederick   | 6,184,430   | 5,352,518                 | 934,348        | 890,427                   | 276,752       | 371,061                   | 951,611          | 738,229                   | 756,788    | 717,621                   | 2,583,984  | 2,496,625                 | 11,808,473  | 10,783,433                |
| Frederick   | 6,644,308   | 5,762,756                 | 1,083,403      | 706,756                   | 323,151       | 283,474                   | 839,049          | 747,891                   | 729,881    | 706,188                   | 2,285,806  | 1,926,042                 | 11,904,408  | 10,181,790                |
| Frederick   | 18,756,795  | 12,038,329                | 2,417,941      | 2,291,427                 | 326,279       | 326,663                   | 2,297,336        | 1,872,987                 | 1,682,637  | 1,570,493                 | 6,631,620  | 6,130,896                 | 12,408,948  | 23,432,357                |
| U. of Balt. | 8,471,005   | 5,426,553                 | 1,309,941      | 930,619                   | 361,266       | 247,538                   | 1,277,496        | 892,168                   | 1,090,381  | 1,117,732                 | 1,043,255  | 1,378,650                 | 14,253,596  | 9,405,177                 |
| Martin      | 6,158,381   | 1,315,746                 | 1,370,131      | 1,253,300                 | 368,866       | 501,538                   | 969,114          | 1,167,530                 | 1,139,382  | 1,167,703                 | 3,362,325  | 1,451,035                 | 15,690,519  | 14,808,034                |
| St. Mary's  | 2,711,479   | 2,075,102                 | 711,496        | 441,781                   | 153,276       | 168,746                   | 496,653          | 447,191                   | 451,916    | 389,478                   | 1,045,165  | 804,863                   | 5,249,985   | 4,577,253                 |
| TOTAL       | 149,047,000 | 127,573,059               | 10,589,456     | 15,396,862                | 5,695,864     | 5,597,681                 | 17,558,088       | 15,542,455                | 16,587,359 | 15,157,915                | 48,651,530 | 45,808,272                | 255,128,297 | 221,076,240               |



TABLE C-2

## 1982 APPROPRIATIONS AS PERCENT OF REVISED GUIDELINES

|                                                                 | Instruction | Administration | Public Safety | Student Services | Library | Plant | Total |
|-----------------------------------------------------------------|-------------|----------------|---------------|------------------|---------|-------|-------|
| <u>University of Maryland</u>                                   |             |                |               |                  |         |       |       |
| Baltimore County                                                | 97.0%       | 102.3%         | 100.4%        | 90.7%            | 114.3%  | 99.7% | 98.6% |
| College Park                                                    | 80.4        | 92.3           | 106.0         | 85.1             | 83.9    | 95.0  | 85.0  |
| Eastern Shore                                                   | 84.7        | 75.8           | 133.8         | 144.1            | 90.9    | 100.2 | 93.6  |
| <u>Board of Trustees of the State Universities and Colleges</u> |             |                |               |                  |         |       |       |
| Bowie State College                                             | 81.9        | 70.6           | 108.0         | 107.4            | 86.9    | 92.3  | 86.2  |
| Coppin State College                                            | 77.5        | 94.1           | 118.9         | 81.4             | 87.2    | 97.5  | 84.7  |
| Frostburg State College                                         | 88.3        | 105.4          | 119.6         | 99.8             | 94.8    | 97.2  | 93.6  |
| Salisbury State College                                         | 86.8        | 65.4           | 88.3          | 83.9             | 97.0    | 67.4  | 84.8  |
| Towson State University                                         | 89.9        | 94.8           | 56.9          | 77.0             | 96.4    | 92.9  | 89.4  |
| University of Baltimore                                         | 60.5        | 71.0           | 68.5          | 68.1             | 102.7   | 63.9  | 66.0  |
| Morgan State University                                         | 89.7        | 95.7           | 136.7         | 99.1             | 102.5   | 93.3  | 94.7  |
| St. Mary's College of Md.                                       | 86.7        | 60.4           | 110.1         | 90.0             | 86.2    | 77.0  | 82.0  |
| Total Public Institutions                                       | 82.9%       | 87.5%          | 98.3%         | 88.5%            | 91.4%   | 93.8% | 86.7% |

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TABLE C-3

## REVISED GUIDELINES

INSTRUCTION GUIDELINE:

- A. Adjusted Cost = \$182,745 + 37% of (the average of 80 and 82 research dollars) + matrix (1982 credit hours)
- B. Adjusted cost = \$182,745 + 37% of (the average of 80 and 82 research dollars) + matrix (average of 80 and 82 credit hours)

## Cost per Credit Hour

|             | <u>Lower<br/>Division</u> | <u>Upper<br/>Division</u> | <u>Graduate</u> | <u>Graduate<br/>Research</u> |
|-------------|---------------------------|---------------------------|-----------------|------------------------------|
| Low         | \$20.075                  | \$ 60.225                 | \$120.45        | \$160.60                     |
| Medium-Low  | 30.1125                   | 90.3375                   | 180.675         | 240.90                       |
| Medium-High | 40.15                     | 120.45                    | 240.90          | 321.20                       |
| High        | 50.1875                   | 150.5625                  | 301.125         | 401.50                       |

An institution should use the option which generates the larger guideline amount.

LIBRARY GUIDELINE:

Cost = \$201,957 + \$24.65 (5% of ALA standard BVE's) + \$1.53 x + \$555 (1980 faculty positions) + 6% of (average of 80 and 82 research dollars - \$10 M)  
 where X = (average of 1980 and 1982 undergraduate credit hours + 3 (average of 1980 and 1982 graduate credit hours) + 5 (average of 1980 and 1982 graduate research credit hours)

PUBLIC SAFETY GUIDELINE:

Cost = \$76,315 + \$58.55 (average of 1980 and 1982 headcount)

ADMINISTRATION GUIDELINE:

Cost = \$173,007 + \$110 (average of 1980 and 1982 headcount) + \$100,139  
 (number of non-guideline programs).

STUDENT SERVICES GUIDELINE:

Cost = \$89,195 + \$229 (number of 1980 admissions applications) + \$75 (average of 1980 and 1982 FTES).

PLANT OPERATION AND MAINTENANCE GUIDELINE:

Cost = \$256,040 + \$153 (average of 1980 and 1982 headcount) + \$0.66  
 (1982 non-auxiliary GSF) + fuel.



tutions, appropriations as a percent of the guidelines ranged from a low of 66.0 percent for the University of Baltimore to a high of 98.6 percent for the University of Maryland - Baltimore County. However, for each guideline, appropriations as a percent of guidelines varied. For the Instruction program, by far the largest component, percentages ranged from a low of 60.5 percent for the University of Baltimore to a high of 97.0 percent for UMBC. Within the Administration program, the range was a low of 60.4 percent for St. Mary's and a high of 105.4 percent at Frostburg. For Public Safety, the percentages varied from 56.9 percent at Towson to 136.7 percent at Morgan; for Student Services from 68.1 percent at the University of Baltimore to 144.1 percent at UMES; for Library, from 83.9 percent at UMCP to 114.3 percent at UMBC; and for Plant, from 63.9 percent at the University of Baltimore to 100.2 percent at UMES. Differences among the programs at the schools reflect institutional priorities within available funds.

#### Instruction

The Instruction budget includes the cost of faculty salaries, the costs of the operation of academic departments, the expenses associated with academic administration for undergraduate and graduate programs, and the costs of departmental research.

The 1976 Instruction guideline has only one component. It is a 3 x 4 matrix which delineates costs per credit hour by level and method of instruction and is shown in Table C-4. Implicit in the graduate research credit hour costs are funds to support departmental research. The revised Instruction guideline has three components: a fixed cost; a variable cost component for instruction; and a variable cost component for departmental research. The variable cost component for Instruction is a 4 x 4 matrix of costs per credit hour delineated by course level and program cost. Data for 1978, 1979, 1980, 1981 appropriation, and 1982 requests were obtained from the institutions for each programmatic area offered and credit hour and cost data by object of expenditure were aggregated to the two-digit HEGIS code level.

TABLE C-4

1976 INSTRUCTION GUIDELINE AS APPLIED IN FY 1982  
MATRIX OF COSTS PER CREDIT HOUR

| HEGIS<br>Code | Instruction Method                    | Cost per credit hour by level of instruction |                                 |          |                      |
|---------------|---------------------------------------|----------------------------------------------|---------------------------------|----------|----------------------|
|               |                                       | Lower Division<br>Undergraduate              | Upper Division<br>Undergraduate | Graduate | Graduate<br>Research |
|               | High Laboratory Intensity             | 89.73                                        | 115.35                          | 215.34   | 897.29               |
| 0100          | Agriculture and Natural Resources     |                                              |                                 |          |                      |
| 0200          | Architecture and Environmental Design |                                              |                                 |          |                      |
| 0400          | Biological Sciences                   |                                              |                                 |          |                      |
| 0900          | Engineering                           |                                              |                                 |          |                      |
| 1200          | Health Professions                    |                                              |                                 |          |                      |
| 1900          | Physical Sciences                     |                                              |                                 |          |                      |
|               | Remedial Instruction                  |                                              |                                 |          |                      |
|               | Mixed Laboratory - Lecture            | 53.84                                        | 64.10                           | 123.04   | 512.66               |
| 0600          | Communications                        |                                              |                                 |          |                      |
| 0700          | Computer and Information Sciences     |                                              |                                 |          |                      |
| 0800          | Education                             |                                              |                                 |          |                      |
| 1000          | Fine and Applied Arts                 |                                              |                                 |          |                      |
| 1100          | Foreign Languages                     |                                              |                                 |          |                      |
| 1300          | Home Economics                        |                                              |                                 |          |                      |
| 1400          | Law                                   |                                              |                                 |          |                      |
| 1500          | Letters                               |                                              |                                 |          |                      |
| 1600          | Library Sciences                      |                                              |                                 |          |                      |
| 1700          | Mathematics                           |                                              |                                 |          |                      |
| 2000          | Psychology                            |                                              |                                 |          |                      |
| 4900          | Interdisciplinary Studies             |                                              |                                 |          |                      |
|               | High Lecture Intensity                | 35.89                                        | 43.07                           | 86.14    | 358.91               |
| 0300          | Area Studies                          |                                              |                                 |          |                      |
| 0500          | Business and Management               |                                              |                                 |          |                      |
| 2100          | Public Affairs and Services           |                                              |                                 |          |                      |
| 2200          | Social Sciences                       |                                              |                                 |          |                      |



Instruction program data for each institution for 1980 are displayed in Table C-5 along with the average costs per credit hour at each institution for each program. The average cost per credit hour ranged from a low of \$12 for Interdisciplinary Studies to a high of \$194 for Library Science. The weighted average cost per credit hour for all disciplines at all schools was \$59 per hour.

Disciplines were then aggregated into four cost ranges as shown in Table C-6. Weighting factors based on analysis of 1980 costs are shown below.

| <u>Cost of Program</u> | <u>Lower Division</u> | <u>Upper Division</u> | <u>Graduate</u> | <u>Graduate Research</u> |
|------------------------|-----------------------|-----------------------|-----------------|--------------------------|
| High                   | 2.5                   | 7.5                   | 15.0            | 20.0                     |
| Medium-High            | 2.0                   | 6.0                   | 12.0            | 16.0                     |
| Medium-Low             | 1.5                   | 4.5                   | 9.0             | 12.0                     |
| Low                    | 1.0                   | 3.0                   | 6.0             | 8.0                      |

In 1980, several Maryland public colleges and universities were expanding enrollments and services to students. Others were facing declining enrollments while a few had stabilized enrollments but were experiencing shifts in levels of enrollment and academic fields. In consideration of this environment, the final form of the revised Instruction guideline provides two computational options for a school. Alternative A allows an institution to use only its projected credit hours in the matrix while Alternative B allows an institution to use the average of its actual and projected credit hours. Alternative A will be chosen by institutions with increasing enrollments, shifts in enrollments to higher cost programs or shifts in enrollments from lower division to graduate. Alternative B will be chosen by institutions that are projecting enrollment declines, shifts in enrollments to lower cost programs, or shifts from graduate to undergraduate enrollment.

A second variable cost component of the Instruction guideline explicitly accounts for the departmental research at each institution. It is assumed

TABLE 2-3

## 1980 AVERAGE COSTS PER CREDIT HOUR

|                                | Average | Min | Max | Min | Max | Univ. of<br>Maryland | Frederick | Salisbury | Towson | Univ. of<br>Baltimore | Morgan | St. Mary's |
|--------------------------------|---------|-----|-----|-----|-----|----------------------|-----------|-----------|--------|-----------------------|--------|------------|
| 1000 Agriculture               | 51      | -   | 48  | 177 | -   | -                    | -         | -         | -      | -                     | -      | -          |
| 1000 Architecture              | 101     | -   | 88  | -   | -   | -                    | -         | -         | -      | -                     | -      | -          |
| 1000 Area Studies              | 31      | 28  | 32  | -   | -   | -                    | -         | -         | -      | -                     | 421    | -          |
| 1000 Biological Sciences       | 41      | 35  | 50  | 31  | -   | -                    | -         | -         | -      | -                     | -      | -          |
| 1000 Business & Management     | 35      | -   | 43  | 37  | 33  | 30                   | 34        | 40        | 31     | -                     | 48     | 76         |
| 1000 Communications            | 32      | -   | 38  | -   | 28  | 310                  | 103       | -         | 32     | 35                    | 17     | 68         |
| 1000 Computer Science          | 35      | -   | 40  | 35  | -   | -                    | -         | -         | -      | -                     | -      | -          |
| 1000 Education                 | 33      | 30  | 34  | 34  | 38  | 140                  | 98        | 40        | 40     | -                     | 35     | 46         |
| 1000 Engineering               | 33      | -   | 33  | -   | -   | -                    | -         | -         | -      | -                     | -      | -          |
| 1000 Fine and Applied Arts     | 47      | 37  | 4   | -   | 39  | 34                   | 37        | 34        | 38     | -                     | -      | -          |
| 1000 Foreign Languages         | 38      | 40  | 45  | 42  | -   | -                    | 46        | 35        | 40     | -                     | 198    | 85         |
| 1000 Health                    | 43      | -   | 38  | -   | -   | -                    | -         | -         | 40     | -                     | 48     | 38         |
| 1000 Home Economics            | 46      | -   | 42  | 130 | -   | -                    | -         | 123       | 44     | -                     | 34     | -          |
| 1000 Law                       | 38      | -   | -   | -   | -   | -                    | -         | -         | -      | -                     | 171    | -          |
| 1000 Library                   | 43      | 40  | 39  | 40  | 44  | -                    | -         | -         | -      | 36                    | -      | -          |
| 1000 Library Science           | 134     | -   | 141 | -   | -   | 4                    | 45        | 39        | 49     | 50                    | 41     | 24         |
| 1000 Mathematics               | 40      | 40  | 38  | 38  | -   | -                    | -         | -         | -      | -                     | -      | -          |
| 1000 Nursing                   | 110     | -   | 38  | -   | 33  | 34                   | 35        | 31        | 41     | 34                    | 38     | 25         |
| 1000 Physical Sciences         | 37      | 30  | 39  | 31  | 35  | 134                  | -         | 108       | 110    | -                     | -      | -          |
| 1000 Psychology                | 44      | 30  | 44  | 48  | 37  | 36                   | 33        | 39        | 44     | -                     | 23     | 53         |
| 1000 Social Science            | 37      | 45  | 40  | -   | 37  | 106                  | 37        | 31        | 34     | 29                    | 52     | 72         |
| 1000 Social Studies            | 40      | 44  | 33  | 38  | 32  | 32                   | -         | 65        | -      | 47                    | 34     | -          |
| 1000 Transdisciplinary Studies | 12      | 13  | 8   | -   | -   | -                    | -         | -         | 32     | 48                    | 30     | 31         |



TABLE C-1

## REVISED INSTRUCTION GUIDELINE

- A. Adjusted cost = \$182,745 + 37% of (the average of 80 and 82 research dollars) + matrix (1982 credit hours).
- B. Adjusted cost = \$182,745 + 37% of (the average of 80 and 82 research dollars) + matrix (average of 80 and 82 credit hours).

## Cost per Credit Hour

| <u>Cost Category</u>           | <u>Lower Division</u> | <u>Upper Division</u> | <u>Graduate</u> | <u>Graduate Research</u> |
|--------------------------------|-----------------------|-----------------------|-----------------|--------------------------|
| Low                            | \$28.08               | \$ 60.23              | \$120.45        | \$160.60                 |
| 0000 Area Studies              |                       |                       |                 |                          |
| 0500 Business                  |                       |                       |                 |                          |
| 0700 Computer Science          |                       |                       |                 |                          |
| 4000 Interdisciplinary Studies |                       |                       |                 |                          |
| 1400 Law                       |                       |                       |                 |                          |
| Medium-low                     | 30.11                 | 60.23                 | 120.45          | 240.90                   |
| 0100 Agriculture               |                       |                       |                 |                          |
| 0600 Communication             |                       |                       |                 |                          |
| 1100 Foreign Languages         |                       |                       |                 |                          |
| 1200 Health                    |                       |                       |                 |                          |
| 1300 Home Economics            |                       |                       |                 |                          |
| 1500 Letters                   |                       |                       |                 |                          |
| 1700 Mathematics               |                       |                       |                 |                          |
| 2000 Psychology                |                       |                       |                 |                          |
| 2100 Public Affairs            |                       |                       |                 |                          |
| 2200 Social Science            |                       |                       |                 |                          |
| Medium-high                    | 40.15                 | 120.45                | 240.90          | 321.20                   |
| 0400 Biology                   |                       |                       |                 |                          |
| 0900 Education                 |                       |                       |                 |                          |
| 0700 Engineering               |                       |                       |                 |                          |
| 1000 Fine Arts                 |                       |                       |                 |                          |
| 1300 Physical Sciences         |                       |                       |                 |                          |
| High                           | 50.19                 | 150.56                | 301.12          | 401.50                   |
| 0200 Architecture              |                       |                       |                 |                          |
| 1600 Library Science           |                       |                       |                 |                          |
| 1200 Nursing                   |                       |                       |                 |                          |
| 0500 Remedial                  |                       |                       |                 |                          |

An institution should use the option that generates the larger guideline amount.

that the departmental research is directly related to the amount of sponsored research that an institution has.

#### Administration

General administrative expenditures are those of offices responsible for planning, organizing, directing, and controlling activities of the entire campus. The guideline developed in 1976 related administrative costs to the instruction budget and for 1982 is:

$$((246.28/\text{FTE}) + .0854) \times (\text{Instruction cost})$$

The revised Administration guideline consists of three parts: a fixed cost component; a component related to enrollment; and a component related to non-guideline programs. The number of non-guideline programs presents a measure of the complexity of the school. For example, UMCP has ten non-guideline programs compared with an average of four non-guideline programs at the ten other four-year public institutions. Headcount students were included instead of FTES because cost was more closely related to headcount than to FTES.

$$\begin{aligned} \text{Administration cost} = & \$173,007 + \$120 (\text{average of 1980 and 1982 headcount}) \\ & + \$100,139 (\text{number of non-guideline programs}). \end{aligned}$$

#### Public Safety

This program provides for the operation of security, safety, and fire protection systems for the campus so that a safe atmosphere for the educational process can exist. The 1976 Public Safety guideline has two components: fixed cost and a measure related to enrollment.

$$\$74,924 + (\$71.37) (\text{FTES})$$

However, it was believed that full-time equivalent students was not as appropriate a measure of the resource requirements for Public Safety as headcount was. Because one FTES could be composed of ten individuals, each taking three credit hours, resource requirements for safety for the one FTES were thought to be more than could be related to one FTES.



The revised guideline has two components, fixed cost and a measure related to headcount enrollment.

Public Safety Cost = \$76,315 + \$58.55 (average of 1980 and 1982 headcount)

#### Student Services

This program is organized around those aspects of campus life that provide non-academic services to students. Typically included in a Student Services program are admissions, registration, student records, counseling center, financial aid, Dean of Students, placement service, health services, minority student services, supplementary educational services, orientation of new and transfer students, and supervision of student activities.

The 1976 guideline for Student Services relates costs to FTES, and provides a fixed cost to each institution for these services.

$\$73,960 + \$263.64 \text{ (FTES)}$

Many states have recognized that the resource requirements for Student Services are more closely related to workload factors other than FTES. For example, some states use a separate workload factor for each activity contained in the Student Services area - financial aid, housing, admissions, placement, etc. However, a guideline of that format is quite complex.

The revised Student Services guideline recognizes that there is a fixed cost component associated with non-academic services for students and that the variable costs of this program are related to the number of admissions applications and FTES:

Student Services Cost = \$89,195 + \$229 (number of 1980 admissions applications)  
+ \$75 (average of 1980 and 1982 FTES)

Although it was expected that headcount would be a better predictor of Student Services needs, FTES explained more of the variation in costs among the eleven institutions. Number of admissions applications similarly explained more of the variation in costs among the institutions than did other variables like

number of financial aid awards. Components to represent other aspects of the Student Services program could not be included in the guideline because of the strong relationship between other factors and the number of admission applications or FTES.

### Library

Library expenditures include all costs associated with library operation, including acquisition costs, cataloging and servicing of materials related to the instruction, research, and public service programs. The 1976 Library guideline relates costs to total credit hours and credit hours by level of instruction and for 1982 is the following:

$$((\$240,172/\text{total credit hours}) + 5.64) \times ((\text{undergraduate credit hours}) + 3(\text{graduate credit hours})) + 5 (\text{graduate research credit hours})$$

University librarians felt that a guideline based solely on enrollment was too simplistic and unrepresentative of the scope and nature of library activities. A revised guideline should be tied more directly to the number of academic programs, processing workloads, and service demands. Although the University librarians recommended three guidelines - one each for materials, staff, and operating expenses - the task force concluded that a guideline for objects of expenditure was inappropriate.

The revised Library guideline is composed of five parts: a fixed cost component; a component for normal ongoing book purchases; a component to reflect faculty needs; a component for enrollment needs; and a component to reflect research needs. The purchase component reflects the ALA position that five percent of the A.L.A. standard number of books required for each institution's library be purchased each year.

The component for service demands is based on the estimation that graduate students require three times as many library resources as undergraduates while graduate students working on theses or dissertations require five times as many. The faculty component includes all faculty in research, teaching, or public service positions and provides dollar support per position. The research



component provides support related to the amount of outside research funding over a base amount equal to \$10 million. The following is the guideline:

$$\text{Library Cost} = \$201,957 + \$24.65 (5\% \text{ of ALA standard BVEs}) + \$1.53 x + \$555 (1980 \text{ faculty positions}) + 6\% \text{ of (average of 1980 and 1982 research dollars less \$10 million)}$$

$$\text{where } x = (\text{average of 1980 and 1982 undergraduate credit hours}) + 3(\text{average of 1980 and 1982 graduate credit hours}) + 5(\text{average of 1980 and 1982 graduate research credit hours})$$

#### Plant Operation and Maintenance

Expenditures for Plant Operation and Maintenance are related to custodial services; grounds and buildings maintenance; repair of structural, electrical and mechanical components of the campus; mail service; utility costs; and any other tasks required to maintain the grounds and buildings of a campus in a good state of appearance and repair.

The 1976 guideline for Plant associates cost with the number of gross square feet maintained and is the following for 1982.

$$\$3.85 x (\text{non-auxiliary GSF})$$

The 1976 guideline is perceived to be too simplistic in that it doesn't take into account the number of students who use the space nor the differences in the mix of utilities and average price of utilities at the various institutions. The revised guideline was developed from factors that are related to cost and provided the best explanation of the differences in costs.

This guideline has four components: a fixed cost; a component related to student use; a measure of the building space maintained; and fuel and utilities. A separate formula will be developed for fuel and utilities that relates fuel and utility cost to weather conditions (with heating and cooling degree days) and BTUs consumed. Until that time, the institution's estimate of fuel and utility costs will be added to the other three components to derive total physical plant costs. The following is the revised guideline for FY 1982.

$$\text{Plant Operation Cost} = \$256,040 + \$153 (\text{average of 1980 and 1982 head-count}) + \$0.66 (1982 \text{ non-auxiliary GSF}) + \text{fuel}$$